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FLETCHER YODER (MICRON TECHNOLOGY, INC.)
P.O. BOX 692289
HOUSTON, TX 77269-2289

EXAMINER	
TOLEDO, FERNANDO L	
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Please find below and/or attached an Office communication concerning this application or proceeding.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/765,481
Filing Date: January 27, 2004
Appellant(s): SHIRLEY ET AL.

Michael Fletcher
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 13 November 2006 appealing from the Office action mailed 3rd April 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Wolf and Tauber; "Silicon Processing for the VLSI Era Volume 1: Process Technology" copyright 1986, Lattice Press; Sunset Beach, CA; pp. 429, 434-437, 452 and 453

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 8, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Wolf and Tauber (Silicon Processing for the VLSI Era Volume 1: Process Technology; pp. 429, 434 – 437, 452 and 453).

In re claim 1, Wolf in the textbook, Silicon Processing for the VLSI Era Volume 1: Process Technology, discloses (a) soft-baking a substrate coated with a resist at a first temperature for a first predetermined period of time, and (b) after act (a) soft-baking the substrate coated with the resist at a second higher temperature for a second predetermined period of time (Figure 14; page 435 and 437).

In re claim 2, Wolf discloses wherein no resist craters are formed (by the inhibition of bubble formation) (page 436).

In re claim 3, Wolf discloses wherein during the first predetermined period of time: the resist hardens (page 436) and the air trapped under the resist does not possess sufficient energy to expand the resist (page 436).

In re claim 4, Wolf discloses wherein during the first predetermined period of time: the resist remains fluid (pp 436 and 437); air trapped under the resist expands through the resist to the surface; and the resist flows back to its original shape (pp 436 and 437).

In re claim 5, Wolf discloses wherein the semiconductor wafer is subjected to a temperature in the range of 30 – 90 °C during the first predetermined period of time (Figure 19 and 20, pp 435 and 436).

In re claim 6, Wolf discloses wherein the first predetermined period of time is less than 90 seconds (page 436).

In re claim 7, Wolf discloses wherein the first predetermined period of time is more than 90 seconds (page 436).

In re claim 8, Wolf discloses wherein the higher temperature is in the range of 90 – 150 °C (page 452).

In re claim 11, Wolf discloses wherein the second predetermined period of time is more than 90 seconds (page 452).

In re claim 12, Wolf discloses a semiconductor wafer comprising a resist layer without craters at the completion of a two-part soft bake of the semiconductor wafer (Figure 14).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolf as applied to claims 1 – 7 above.

In re claim 9, Wolf discloses wherein the higher temperature is in the range of-90 °C (page 452). Wolf does not disclose wherein the temperature is 100 - 130 °C.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a higher temperature of 170 - 180 °C, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233. In addition, the selection of temperature, its obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and In re Aller, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious). Note that the specification contains no disclosure of either the critical nature of the claimed temperature ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen temperature ranges or upon another

variable recited in a claim, the Applicant must show that the chosen temperature ranges are critical. *In re Woodruf,* 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

In re claim 10, Wolf discloses wherein the second predetermined period of time is 5 – 10 minutes. Wolf does not disclose wherein the second predetermined period of time is less than 90 seconds.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a second predetermined period of time of less than 90 seconds, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233. In addition, the selection of time is obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1.935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and In re Aller, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious). Note that the specification contains no disclosure of either the critical nature of the claimed time range or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen time range or upon another

variable recited in a claim, the Applicant must show that the chosen time range is critical. *In re Woodruf,* 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

(10) Response to Argument

Appellant's arguments are not persuasive for the following reasons.

Appellant argues that Wolf does not teach the claimed invention in particular; Appellant argues that Wolf is silent on the teachings of a two-step soft bake. Appellant also argues that Wolf's soft-bake is only a one-step soft-bake and not a two-step soft-bake.

Examiner respectfully submits that Wolf teaches a two-step soft-bake process as claimed by Appellant. Appellant claims that the first part of the two-step soft-bake is at a lower temperature than conventional soft-bake temperature. Wolf teaches in particular bake method using an IR oven that shows a ramp-up temperature that is maintained at a lower temperature than the conventional soft-bake temperature for a predetermined amount of time. Figure 20 (c) in particular shows the ramp-up temperature being from ~25 °C to ~100 °C and lasts for about one minute. This ramp up by Wolf meets the limitation as set by Appellant in independent claim 1 and dependent claims 5 and 6. Appellant is silent as to weather the first temperature is constant for a period of time. Appellant is also silent as to weather the first step of the soft-bake is ramped-up to a first temperature and held at that temperature for a period of time and then it is ramped up again to a second temperature which would be the second step of the two-step soft-bake process. Absent of these processing steps; the Examiner gives the claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. In re Prater, 415 F.2d 1393, 1404-05, 162

USPQ 541, 550-551 (CCPA 1969). See *also In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow. . . . The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed. . . . An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process.").

Appellant also argues that Wolf is silent about the absence of craters.

Examiner respectfully submits that Wolf teaches that limitation on page 436 which states that "[s]olvent is most effectively removed nearest the interface, and such removal inhibits entrapment or bubble formation." As it is well known, air will form bubbles and expand until the trapped air escapes forming craters. Wolf implies that the resist would have an absence of craters since the reference discloses that it would inhibit the formation of bubbles.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Fernando L. Toledo

Conferees:

Matthew Smith

Darren Schuberg

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.